State Planning and Research

2004 SPR

Work Program and Estimate of Cost

MINNESOTA DEPARTMENT OF TRANSPORTATION

In cooperation with the
U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

STATE PLANNING AND RESEARCH

Calendar Year 2004

PART I: PLANNING

PART II: RESEARCH, DEVELOPMENT & TECHNOLOGY TRANSFER

STATE OF MINNESOTA

DEPARTMENT OF TRANSPORTATION

In cooperation with

US DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

This program is prepared and submitted according to provision of Section 307 of Title 23, United States Code as amended. The new Federal transportation bill has not been passed by Congress, therefore, funding levels for the last year of TEA-21 of $5.4 million for Statewide planning, $2.6 million for Metropolitan Planning Organization planning and $1.8 million for research activities have been assumed.

The contents of this program describe the continued efforts of the Minnesota Department of Transportation in State planning and research activities. This document is organized into several parts. Part I of this program is a summary of the Statewide Planning program. Part II is a summary of the Cooperative Research program. Part III is the financial summary of the total estimated participation costs of the program. Appendix A details the task objectives, methodologies and products by office in the Minnesota Department of Transportation. Appendix B provides the description of research studies. Appendix C summarizes pooled fund projects with balances but not contributed to in the 2004 SP&R program.

Semi-annual status reports on products will be prepared and submitted to document the progress of Part I of the program. Part II research activities are updated on a quarterly basis.

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PART I: PLANNING

ITEMIZED COST ESTIMATED

JANUARY 1, 2004 – DECEMBER 31, 2004

FUNDING SUMMARY: STATEWIDE PLANNING PORTION OF PART I

Office of Investment Management	**$1,985,380**
Office of Transit	**$694,738**
Office of Transportation Data Analysis	**$2,740,264**
Office of Financial Management	**$31,500**
Office of Traffic, Security and Operations	**$157,334**
Office of State Aid	**615,453**
Office of Technical Support	**$1,249,663**
Office of Freight & Commercial Vehicle Operations	**$326,186**
Total	**$7,800,518**
Total Federal Statewide Planning funds available	**$5,356,337**
State funded difference	**$2,444,181**

OFFICE OF INVESTMENT MANAGEMENT

State Transportation Improvement Program..... $182, 402

Salaries...../12 Person Months

State Transportation Plan and Statewide Planning Services.....$434,437

Salaries...../43 Person Months

Federal & State Transportation Programs.....$449,249

Salaries...../50 Person Months

Transportation & Economic Analysis.....$589,622

Salaries...../24 Person Months

Land Use Access Management..... .....$329,669

Salaries...../48 Person Months

TOTAL ESTIMATED COST.....$1,985,380

OFFICE OF TRANSPORTATION DATA & ANALYSIS

Transportation Information System (TIS) Management $848,389

Salaries.....848,389/145 Person Months

Vehicle Classification and Truck Weight Studies.....$456,423

Salaries.....448,023/73 Person Months

Travel.....5,300

Overtime 3,100

Traffic Counting $442,865

Salaries.....412,365/91 Person Months

Travel.....18,100

Overtime 12,400

Traffic Forecasting for Highway Design…….....$122,694

Salaries..... 122,694/31 Person Months

Transportation Information System Re-Engineering $126,144

Salaries.....126,144/18 Person Month

Municipal Maps.....$215,599

Salaries.....215,299/32 Person Months

Travel.....300

St. Paul – Minneapolis Area Maps.....$111,961

Salaries.....111,861/16 Person Months

Travel.....100

County Maps $121,547

Salaries.....121,247/18 Person Months

Travel.....300

State Maps $50,087

Salaries.....49,887/7 Person Months

Travel.....200

GIS Base Map.....$244,555

Salaries.....244,055/41 Person Months

Travel.....500

TOTAL ESTIMATED COST.....$2,740,264

OFFICE OF TRANSIT

Transit Program Planning $275,860

- Salaries.....$261,900/35 Person Months
- Travel..... 5,000
- Newsletter. 3,000
- Misc 5,960

Transit Research & Program Evaluation $147,140

- Salaries.....$140,210/23 Person Months
- Travel..... 4,000
- Misc. 2,930

Bikeway Planning $396,738

- Salaries.....$322,725/60 Person Months
- Travel..... 6,000
- Professional/Technical..... 55,000
- SBAC..... 8,000
- Misc 5,013

TOTAL ESTIMATED COST.....$694,738

OFFICE OF FINANCIAL MANAGEMENT

Highway Statistics $31,500

Salaries.....11,500/2 Person Months

Consultant.....20,000

TOTAL ESTIMATED COST.....$31,500

OFFICE OF TRAFFIC, SECURITY AND OPERATIONS

Speed Data Summaries $21,626

Salaries.....21,626/3 Person Months

Accident Surveillance $135,708

Salaries.....135,708/23 Person Months

TOTAL ESTIMATED COST.....$157,334

OFFICE OF STATE AID

County State Aid Highway $309,950

Salaries.....302,550/48 Person Months

Travel.....4,600

Supplies.....2,800

Municipal State Highway Need Study..... $305,503

Salaries.....301,203/46 Person Months

Supplies.....2,300

Travel.....2,000

TOTAL ESTIMATED COST..... $615,453

OFFICE OF TECHNICAL SUPPORT

Trunk Highway Cultural Resource Investigation

Contracts.....$1,175,000

Minnesota Historical Society and Cultural Resource Firms

County/Municipal Cultural Resource Investigation

Contracts.....$74,663

Minnesota Historical Society and Cultural Firms

TOTAL ESTIMATED COST.....$1,249,663

OFFICE OF FREIGHT AND COMMERCIAL VEHICLE OPERATIONS

Freight Planning, Studies and Data Management.....$326,186

Salaries..... 48 Person Months

TOTAL ESTIMATED COST.....$326,186

PART I: PLANNING

C.Y. 2004 METROPOLITAN PLANNING ORGANIZATION (MPO) FUNDING DISTRIBUTION

MPO	FHWA (PL)	FTA (Sec. 5303)	TOTAL (Planning funds avail.)
Twin Cities Metropolitan Council	$1,749,751	$565,741	$2,315,492
Duluth-Superior MIC	274,052	88,609	362,661
St. Cloud APO	246,554	79,200	325,754
Rochester – Olmsted COG	236,458	76,453	312,911
Fargo – Moorhead COG	81,945	27,012	108,957
Grand Forks/E. Grand Forks MPO	21,702	7,016	28,718
La Crosse Area Planning Committee	14,165	4,580	18,745
TOTAL	$2,624,627	$848,611	$3,473,238

Notes

The MPOs and Mn/DOT developed a formula for the distribution of the Consolidated Planning Grant (CPG) funds, which was approved by both FHWA and FTA.

The total PL figures are the final CY 2003 distributions. These are being used because the new authorization bill has not been passed.

Because of the above note, the numbers do not necessarily reflect the MPOs' 2004 Unified Planning Work Programs (UPWPs).

We will make the necessary adjustments in the UPWPs when the final FHWA and FTA appropriations are received.

PART II: RESEARCH AND DEVELOPMENT

ITEMIZED COST ESTIMATED

JANUARY 1, 2004 – DECEMBER 31, 2004

COOPERATIVE RESEARCH

State Study No. *(Asterisk denotes lead state project)	Study Title	Commitment in Dollars ($)	New (N), Modification (M) or Ongoing Projects (O)	MnDOT Contact
SPR-TPF5(044)	National Cooperative Highway Research Program (NCHRP)	$392,793	N	
0002(207)	Traffic Management Center (TMC) Study	$50,000	M	Thompson
0002(208)	Subgrade Failure Criteria (CRREL)	$20,000	M	Engstrom
0003(017)	Midwest State Crash Testing Timber Rub Rail project (additional project added for '03)		O	Dehdashti
0003(020)	Enterprise	$25,000	M	Nookala
0003(042)	Aurora	$25,000	M	Curt Pape
0003(049)	Urban Mobility Study		O	Henkel
0003(073)	Micro-Surface Mix Design Procedure		O	Geib
0003(074)	State Consortium for Pavement Technology (Pavement Research and Technology)	$15,000	M	Keranen
0003(095)	Cooperative Vehicle-Highway Automation System CVHAS (Phoenix Project)	$100,000	N	Taavola
TPF5 (001)	Soil Mix Methods for Highway application		O	Person
TPF5(021)	North Central Superpave Center (NCSC)		O	Olson
TPF5(042)	Investigation of the Long-Term Effects of Magnesium Chloride	$20,000	M	Turgeon
TPF5(045)	Performance Guidelines for the selection of Hot-Pour Crack Sealants.	$20,000	M	Olson
TPF5(051)	Construction of Crack-Free Concrete Bridge Decks	$15,000	M	Wolhowe
TPF5(054)	Development of Maintenance Support System		O	Pape
TPF5(055)	Rapid Bridge Replacement techniques		O	Wolhowe

State Study No. *(Asterisk denotes lead state project)	Study Title	Commitment in Dollars ($)	New (N), Modification (M) or Ongoing Projects (O)	MnDOT Contact
TPF5(066)	Material & Construction Optimization	$15,000	M	Schwartz
TPF5(068)	Long Term Maintenance of Load & Resistance Factor Design Specs		O	Wolhowe
TPF5(069)	TRB Core Program Services for FY'04	$104,315	M	Billiar
* TPF5(070)	2nd International Conference on Accelerated Pavement Testing		O	Worel
* TPF5(073)	Portable Non-Intrusive Technology for Traffic Detection (PNIT)		O	Kotzenmacher
TPF5(078)	Upper Midwest Corridor Study		O	Gardner
* TPF5(080)	Investigation of Low Temperature Cracking in Asphalt Pavements		O	Worel
* TPF5(086)	Reducing Crashes at Rural Intersections (IDS)		O	Taavola
COOPERATIVE RESEARCH - TOTAL		**$802,108.00**		

Notes:
N = New Project. OIM prepares paperwork and forwards to FHWA.
M = Modification. Federal aid section of Finance prepares the paperwork on modifications and forwards to OIM.
O = Ongoing Project. No funds will show in the "Commitment" column. (Gray box)
*** = Minnesota DOT has responsibility for administration of the project.**

ITEMIZED COSTS NOT COMMITTED TO COOPERATIVE RESEARCH

	AMOUNT
SPR-0001(044) Research Projects, Technology Transfer, Implementation, Special Projects & Administration	**$1,785,446.00**
Unexpended Previous Years – 0001(035) $211,314.73 & 0001(036) $540,369.29 & 0001(043) $1,400,143.15	**$2,151,827.17**
RESEARCH TOTAL AVAILABLE	**$3,937,273.17**
Less Cooperative Research	**$802,108.00**
Total Unexpended Balance – All Years	**$3,135,165.17**

PART III
FINANCIAL SUMMARY
STATE PLANNING AND RESEARCH PROGRAM
Calendar Year 2004

TOTAL ESTIMATED PARTICIPATION

	Federal Participation	Fed. Project Number	Appropriation code
Statewide Planning	$5,356,337	SPR-0001(044)	H55
MPO Planning	$2,624,627	--	H45
Research	$1,785,446	SPR-0001(044)	H56
Total	$9,766,410	NA	NA

Notes:

- State funds added $2.1 million for a State-wide planning total of $7,800,518
- MPO Planning funds are supplemented by FTA funds, State funds and Local funds.
- Research program is supplemented by State funds.

APPENDIX A

OFFICE OF

INVESTMENT

MANAGEMENT

TASK TITLES: State Transportation Improvement Program (STIP)

ESTIMATED COST: $182,402

WORK AUTHORITY NUMBER: TH 101

WORK PERFORMED BY: Program Development Section

OBJECTIVES:

- Provide guidance in the planning and development of the federally required, fiscally constrained, three year STIP document that includes all anticipated expenditures for all modes of transportation under the authority of Mn/DOT. Publish and distribute the final Web Page availability. Provide analysis as requested. Process STIP amendments and publish web site.

ACTIVITIES:

- Prepare State Transportation Improvement Program & Amendments
- Prepare State Transportation Improvement Program Guidance
- State Transportation Improvement Program Analysis

METHODOLOGY:

- STIP Guidance and Development: Guidance for the development of the State Transportation Improvement Program (STIP) is provided through continuous communication with the District/ATPs and other partners. A Guidance document provides transportation goals objectives and direction for use in making statewide transportation investment.
- The Area Transportation Partnerships (ATPs) submit prioritized lists of candidate projects based upon the integration of transportation priorities from modal interest, RDC's and MPO's and Mn/DOT consistency. A draft STIP is developed and reviewed by the District/ATP and with their comments considered. A final STIP is prepared.

PRODUCTS:

- STIP Guidance and STIP: Guidance is updated periodically and sent to the districts. The three-year State Transportation Improvement Program is produced annually.

TASK TITLES: Statewide Transportation Plan and Statewide Planning Service

ESTIMATED COST: $434,437

WORK AUTHORITY NUMBER: TH 102

WORK PERFORMED BY: Statewide Planning & Analysis Section

OBJECTIVES:

- Assist the Metropolitan Planning Organization (MPO's) in developing and maintaining a transportation planning process that fulfills the requirements of the appropriate federal regulations.
- Develop and manage the process of developing a statewide multi-modal transportation plan including scope of services development and management of a consultant contract for statewide multi-modal transportation plan. Provide statewide planning services to districts and other partners/customers; and provide guidance and planning services to districts, offices and other partners. This would include planning studies statewide in scope, public participation processed and other required or necessary activities.
- Perform the necessary activities for evaluating the physical characteristics, performance on all networks in Minnesota.

ACTIVITIES:

- MPO Planning Office
- MPO Planning Field
- Statewide Transportation Plan
- Statewide Transportation Planning Services
- RDC Area Planning
- Highway performance Monitoring System
- Functional Class & National Highway System

METHODOLOGY:

- Coordinate with Mn/DOT district planning staff in the development, review and /or approval of MPO planning documents to ensure the MPOs maintain certifiable transportation planning. Facilitate MPO planning committees to ensure awareness and use of state of the art planning procedures, through training and technical assistance that respond to mutual transportation concerns.

- Prepare a statewide transportation planning and policy studies – such as the Statewide Transportation Planning – to serve as a consultant in developing frame works for district, division and model plan. Assist districts in developing district long-range transportation plans. Coordinate, review and respond to national and state initiatives, policies, and proposed regulations which impact on transportation. Administer and coordination Mn/DOT transportation planning committees and units of local government.

- Maintain the capability to periodically assess by measuring the performance and quality through annual reports upon the condition o f the highways, roads and streets in Minnesota using the Highway Performance Monitoring System. Create, maintain and provide maps and records in an up-to-date status/revision as necessitated for the Functional Classification system and the National Highway system.

PRODUCTS:

- Annual MPO Planning Work Programs and Funding Distribution Agreements.

- Annual MPO Transportation Improvement Program (TIP) and Certification.

- Provide reports and/or maps for highway studies as requested by FHWA, State and Local Road Authorities.

- Development of the Statewide Transportation Plan revisions and updates.

- Development of guideline and performance measures to support statewide transportation policies.

TASK TITLES: Federal & State Transportation Programs

ESTIMATED COST: $449,249

WORK AUTHORITY NUMBER: TH 103

WORK PERFORMED BY: Project Authorization Unit, Regulatory & Policy Analysis Section and Planning & Program Development Unit

OBJECTIVES:

- Provide administration of the Federal Aid Highway Program to maximize federal funds and utilize those funds efficiently. Provide budgetary control and fiscal management of the State Road Construction Programs in accordance with legislative constrains and Mn/DOT policy.
- Provide the direction, supervision and general office work necessary for the administration of the State Planning and Research Work Program.
- Maintain computerized Mn/DOT program delivery schedules and to further develop the financial tracking of projects in PPMS.

ACTIVITIES:

- Transportation Program Administration
- Federal Aid Coordination
- Emergency Relief Program
- State Planning and Research Program
- Federal Aid System Interface
- Transportation Revolving Loan Fund Program
- PPMS

METHODOLOGY:

- Conduct the Federal Aid Programming process, the FHWA project status and the submittal of projects to FHWA for authorization. Coordinate compliance with all federal aid requirements, engineering and fiscal by other division of Mn/DOT offices. Provide directions to the flow of federal funds between Mn/DOT and FHWA for their most efficient innovative use. Ensure the program context is compatible with program funding distribution. Maintain program budget status by listing expenditures, anticipated expenditures and balances. Make the necessary adjustments that conform to legislative budget limits.

- Special federal aid programs: Program all viable projects in compliance with the published FHWA guidelines. These include:
  - Forest Highways
  - Public Lands Highways
  - Emergency Relief
  - State Planning and Research
- Using the project management system to update data such as letting dates, program funding estimates, amounts of contract awards, type of funding, funding agreements, post award changes and program status.

PRODUCTS:

- Efficiently use federal and other transportation funds in Federal Program.
- State Planning and Research Program annual report.
- Use a current on-line state program as a tool in managing State Aid, Transit and Mn/DOT Construction program as a statewide program management and project scheduling system.

TASK TITLES: Transportation and Economic Analysis

ESTIMATED COST: $589,622

WORK AUTHORITY NUMBER: TH 104

WORK PERFORMED BY: Economic Analysis & Special Studies Section

OBJECTIVES:

- Determine the most cost effective investments for transportation system improvements. Develop investment criteria to evaluate economic feasibility and priority for proposed projects. Analyze economic, demographic transportation and the related trends for their impact on transportation demand. Analyze transportation financing trends and transportation issues like Interregional Corridors. Conduct economic analysis for specific transportation investments especially on benefit/cost analysis, financial analysis and business development impact analysis.

ACTIVITIES:

- Transportation & Economic Analysis (Non-project specific)
- Transportation & Economic Analysis (Project specific)

METHODOLOGY:

- Investigate the relationship between transportation along with highways and the economies of the state and nation on topics such as:
- Effects of major demographic business and economic trend on transportation system demands and revenues.
- Economic efficiency or financial returns of major transportation system segments and corridors.
- Extend of benefit accrued to local, regional, statewide and/or nation economies from transportation projects.
- Economic impact of alternative solutions to urban transportation problems.
- Focus on economic activities and transportation relationship among Twin Cities, regions and inter-regions of other states.
- Distributional effects of transportation investments.
- Develop criteria for evaluating the economic impact and feasibility of transportation projects through activities such as:

- Conduct benefit/cost analysis of proposed transportation projects.
- Calculate the economic rate of return to transportation investments.
- Evaluate benefit-cost on transportation investments across identified groups in society.
- Develop standard techniques and practices to implement investment analysis.
- Incorporate accepted criteria on investment analysis to prioritize and project selection process.
- Provide personnel involved in transportation process technical training and implement investment analysis.
- Communicate outcome of investigations by means of reports, presentations or others technique to appropriate audience the status of projects identified.

PRODUCTS:

- Components in scoping, environment and other documents for pending projects.
- Workshop on use of investment analysis tools in transportation investment.
- Reports in different formats, for examples memos, working papers and research reports, on issues investigated and appropriate status noted above and intended audiences.
- Investment guidelines or criteria.
- Economic analysis training materials such as methodologies and standard values.

TASK TITLES: Land Use Access Management

ESTIMATED COST: $329,669

WORK AUTHORITY NUMBER: TH 105

WORK PERFORMED BY: Land Use and Access Management Section

OBJECTIVES:

Provide policy guidance and technical assistance to Mn/DOT Districts/Metro Division and local government partners on approaches to manage access on all types of roads throughout the state. Produce and maintain the Access Management Manual that defines a Roadway Access Category System. Recommend access spacing. Outline methodologies for application of the System to corridor planning, project development and local land use transportation planning. Establish a uniform access permitting procedure. Provide training to planners and engineers on the Manual content at Mn/DOT Districts, Divisions, offices and local government. Provide technical assistance to Mn/DOT and local partners in planning efforts to coordinate long rang land use and transportation plan with a special emphasis on IRC Corridor related issues.

ACTIVITIES:

- Develop and administer land use and access management policies
- Design and implement research and demonstration projects
- Access management/land use technical assistance

METHODOLOGY:

- Research, develop and implement a comprehensive set of strategies that integrate engineering, land use planning and legal approaches to improve land use and access management practice throughout Minnesota.
- Promote stronger intergovernmental partnerships by providing common access guidelines for use by all partners. Education training and technical assistance in access management and land use integration.
- Promote the safety and mobility of the traveling public.
- Protect and extend the useful life of the public's investment in the State's highway system.
- Support the economical vitality, character and livability of the local community.
- Achieve stronger integration of local government land use decision with state transportation goals and policies including Smart Growth, Interregional Corridors and Multi-modalism.

PRODUCTS:

- Access Management Categories and Spacing Guidelines
- Permitting Procedures
- Category Assignments
- District Training and Technical Assistance
- Local Government Workshops and Technical Assistance

OFFICE OF

TRANSPORTATION

DATA & ANALYSIS

TASK TITLES: Transportation Information System (TIS) Management

ESTIMATED COST: $848,389

WORK AUTHORITY NO: TH 202

WORK PERFORMED BY: Transportation Data Section

OBJECTIVE:

- To manage the TIS by providing system, software, hardware and user support, data collection, file updating and maintenance, and by developing products such as visual and graphic reports.
- To act as liaisons between various Mn/DOT offices using the Transportation Data System (TIS) data and to maintain relationships with both internal and external users of TIS.
- To research, test and apply new products and technology in order that the various activities being conducted under this task are constantly improved and made more efficient.

METHODOLOGY:

The Office of Transportation Data and analysis is responsible for a major Information Resource System comprised of a number of databases and systems used for transportation planning and analysis. This system incorporates data about roads (trunk highways and all other roads), railways, and bridges. This data includes physical characteristics (both vertical and horizontal), geometric features, various attributes such as traffic volumes and classification, accidents, and designation information such as route system and number, federal classification, street names etc.

This task consists of data collection, data maintenance, file maintenance, training users, and providing reports as needed or requested. Data is collected using various methods such as laptop computers for vehicle classification data, and requests to various offices and government agencies for resolutions, construction plans, roadway status reports etc. This information is used to update current information and create new records and is made part of the TIS through several methods such as manual data entry, file transfers, etc.

The information contained in the TIS is used by transportation decision makers, planners and analysts and is provided in multiple forms such as text reports, graphs, and attribute maps for transportation planning, investment tradeoff analysis and project development.

To ensure that this system is available whenever it is needed and the data maintenance and report generating functions operate properly and efficiently support is provided for software and hardware maintenance and troubleshooting. Programming and System analysis services, hardware installations, system enhancements and modifications, and overall system support is furnished.

As part of these task systems personnel (analysts, programmers, data maintainers, users, etc.) are provided with training, manuals, and periodic articles and information to assure everyone is kept current of any relevant TIS changes or problems and their resolution.

PRODUCTS:

Prompt, efficient and accurate TIS file updates using up to date, state of the art data maintenance and collection methods, which meet the needs of the end users.

TIS roadway data files able to be accessed by users with remote terminals.

Current data on the physical characteristics of roads, trunk highway construction histories, mileage, traffic and crashes is available for input into the T.I.S. to be used for various studies and for reporting to the FHWA's Highway Performance Monitoring System (HPMS).

Local road attributes maps for use by DPS and law enforcement agencies and Road Life records, Construction Project Logs, and Control Section Listings to be used as references by districts and other offices and agencies.

Hardware configuration, system data files, computer programs, and systems documentation to meet the needs of various internal and external users.

Maps, reports, user manuals, memos and articles detailing TIS capabilities, and in house and on-site training in TIS and IBM software systems (JCL, TSO, ISPF, IOF).

TASK TITLES: Vehicle Classification / Truck Weight Studies

ESTIMATED COST: $456,423

WORK AUTHORITY NO: TH 213

WORK PERFORMED BY: Traffic Forecasting and Analysis Section & Weight Data & Enforcement Policy Coordination Section

OBJECTIVE:

To determine the types and weights of vehicles using the States roadways and continually improve the methods used to accomplish this. Analyze and report on the data in the format needed by Mn/DOT traffic forecasters, FHWA, and various other public and private parties.

- Process vehicle classification data collected both manually and automatically throughout the state. About 100 locations are counted on a two year cycle with approximately 900 other site counted on a six year cycle.

- Process the truck weight data collected by Weight-In-Motion scales at permanent locations.

- Evaluate and update traffic data collection and analysis methods through the use of statistics, new technology and computer software while making available additional traffic data in the Transportation Information System (TIS).

- Provide expertise and coordination in the development and dissemination of weight enforcement policies and regulations

METHODOLOGY

Through the use of PC based programs, the raw data is processed to represent average day of the year values. Review of current methods and the use of innovative techniques will facilitate meeting users' needs.

- Develop plans and enforcement policy proposals and make recommendations; attend various meetings and hearings and provide technical advice. Carry out strategy changes and equipment purchases to improve weight enforcement productivity.

PRODUCTS:

- Annual Vehicle Classification and Truck Weight reports.
- Truck volumes produced biennially on the state traffic flow map.
- Heavy Commercial volumes input into TIS.
- Analysis of data and special studies.
- Weight enforcement policies
- Improved interagency coordination and communication processes.
- Improved weight data expert system development.

TASK TITLES: Traffic Counting

ESTIMATED COST: $442,865

WORK AUTHORITY NO: TH 214

WORK PERFORMED BY: Traffic Forecasting and Analysis Section

OBJECTIVE:

- To conduct and continually improve our traffic counting program which provides data for determining annual average daily traffic (AADT), vehicle miles of travel (VMT) and growth trends for Mn/DOT traffic forecasters, FHWA, and various other public and private agencies.

METHODOLOGY:

- Determine short duration and continuous (Automatic Traffic Recorder – ATR) traffic data requirements and sampling plan for the State's traffic Monitoring Program.

- Coordinate and oversee the collection of traffic data from central office, District and local government agencies, and maintain the data processing infrastructure to process and manage traffic data.

- Develop and apply proper axle correction and seasonal/day-of-week adjustment factors to trunk highway (TH) and local road short duration counts and develop official AADT for all segments according to the count cycle schedule (either 2 or 4 years).

- Help to ensure that all traffic monitoring equipment is tested and repaired when necessary.

- Continuously improve methods for screening, interfacing and reporting raw and final traffic estimates using statistics, new technology, and computer software.

PRODUCTS:

- Statewide, seven county metropolitan area and 52-sheet series, county and city maps depicting TH, County Road and Municipal State Aid street AADT's on paper and CD and via the office web page.

- An ATR summary report containing annual AADT and monthly comparisons, rank order hourly volume data, and maps illustrating ATR locations.

- Count location maps and supporting materials for fieldwork activities.

- Analysis of data to determine adjustment factors, trends and VMT estimates in addition to other special studies and technical assistance.

TASK TITLES: Traffic Forecasting and Highway Design

ESTIMATED COST: $122,694

WORK AUTHORITY NO: TH 216

WORK PERFORMED BY: Traffic Forecasting and Analysis Section

OBJECTIVE:

- To provide training, traffic monitoring data, auditing and reports for traffic forecasting to the districts and Metro Division.
- Maintain database of traffic forecasts.
- Provide Metro Division and Districts with technical support in traffic forecasting.
- Monitor and report short-term traffic trends.
- Assist Metropolitan Planning Organizations and communities with traffic forecasting training and technical studies.

METHODOLOGY:

- Through the use of various computer traffic models, forecasting techniques and analysis of traffic data, provide Metro Division and the districts with instructions on calculating projections of future truck and auto volumes.

PRODUCTS:

- Systems Planning and Analysis reports.
- Individual highway traffic volume and load estimates.
- Estimates of truck volumes and movements.
- Special studies and reports.

TASK TITLES: Transportation Information System (TIS) Migration and Conversion

ESTIMATED COST: $126,144

WORK AUTHORITY NO: TH 224

WORK PERFORMED BY: Transportation Data Section

OBJECTIVE:

- To continue conversion and migration of the Transportation Information System data from the mainframe to a relational database in the WINDOWS environment building applications that parallel the current TIS applications and creating new applications as needed.

METHODOLOGY:

- TIS, which is used to support reporting requirements for HSIS, HPMS, and other departmental needs and activities such as bridge management, pavement management, and bikeway management, resides on an IBM mainframe computer. It suffers from a number of deficiencies that make it difficult to meet the transportation data management and analysis need of Mn/DOT. Examples of specific problems are listed below:

- Not user friendly.

- Information not easily accessible and quantified.

- Costly and cumbersome data maintenance procedures.

- Data outdated, incomplete and inaccurate.

- Cannot easily integrate with mapping software (GIS, CAD).

- System environment and architecture is very outdated (over 25 years old).

- Increasingly difficult to find information resource professionals who know IBM mainframe operating systems, procedures and programs (TSO, JCL, PANVALET, PL/1, EASYTREIVE) that are being used to maintain the system.

To correct the deficiencies and meet future needs the following will be done:

- Design and build a relational database (Oracle) that will parallel the current structure of TIS and to build applications that correspond to TIS applications and create new applications as may be needed. The new system will be user-friendlier and will provide for easy integration of geographic applications (GIS and CAD).

- Move the roadway data from the mainframe to an Oracle database.

- Create editing methods using ORACLE tools

PRODUCTS:
A relational database in Oracle with redesigned data files, data maintenance procedures, and analysis and reporting software, which can be integrated with GIS applications.

TASK TITLES: Municipal Maps

ESTIMATED COST: $215,599

WORK AUTHORITY NUMBER: TH 601

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- To prepare and maintain a complete set of planimetric street maps at suitable scales for all incorporated municipalities in Minnesota. These maps are used by the department for general-purpose planning and operational functions and for municipal corporate boundary reference. In addition, many federal, state and local agencies and the general public use these maps for business and recreational purposes.

METHODOLOGY:

- The original base maps of all incorporated municipalities are prepared in accordance with standards outlined in the *FHWA Guide for a Highway Planning Map Manual (Volume 20, Appendix 25).* Municipalities are categorized as being over or under 5,000 population. The procedures followed in producing these maps are the same in both cases.

- Municipalities having a population of 5,000 or greater are represented individually on one or more 24″ x 36″ map sheet. Municipalities with less than 5,000 populations are grouped by county on one or more 24″ x 36″ sheets with as many municipalities on a sheet as space will allow.

- At present there are 136 incorporated municipalities having a population of 5,000 or more on 150 map sheets; and 708 incorporated municipalities of less than 5,000 population on 255 sheets. This makes a total of 854 municipalities represented on 405 24″ x 36″ map sheets.

- In the development and maintenance of municipal maps, all possible current information is collected and compiled from the same various map information sources as listed under county maps. (See TASK TITLES on County Maps.)

- With the implementation for Computer-Assisted Design and Drafting (CADD), we are in the process of converting all our map products computer-generated maps. This process is called “digitizing” where the locations of geographic features (those elements to be mapped) are recorded as digital x, y coordinates in a computer file.

- Update and revision are achieved by either manually drafting any changes to be made on those municipal maps that have not been converted to a digital format or by entering any revisions to be made in the appropriate digital file and obtaining a new plot. At present 100% of the municipalities having a population of 5,000 or

more and 78% of the under 5,000 population municipalities have been converted to a digital format.

- Graphic records for all of Minnesota's municipal corporate boundaries are maintained by the Geographic Information and Mapping Unit. For the past three years, an average of over 350 boundary revisions per year has been processed. Due to age, many of these paper graphic files are in poor condition. We are in the process of converting those plats that are in the most serious condition and those that generate the most revision activity to a digital format.

- For those deteriorating graphic records that only need preservation, a technique called "scanning" is used to generate a digital raster file. For those graphic records that have constant or extensive revisions to be mapped, digital vector CADD files are created from the existing analog map and supplemented with additional information from appropriate Mn/DOT Right-of-Way maps, plat maps, legal land descriptions, local government GIS files and city engineer maps.

- Municipal State Aid Street (MSAS) maps are produced for all municipalities having a population of 5,000 or more. MSAS maps delineate state trunk highways, County State-Aid Highways (CSAH), County Road (CR) and MSAS routes on the appropriate municipal map. These various route systems are shown by computer generated line patterning on the corresponding route. Additionally, MSAS streets are labeled with the number assigned in the Commissioner's Order that establishes the designation.

PRODUCTS:

- A complete set of planimetric street maps of all 854 incorporated municipalities in Minnesota.

- Municipal State Aid Street (MSAS) maps for all incorporated Minnesota municipalities having population of 5,000 or more.

- Graphic boundary record maps for all 854 incorporated municipalities in Minnesota.

TASK TITLES: St. Paul–Minneapolis Metropolitan Area Maps

ESTIMATED COST: $111,961

WORK AUTHORITY NUMBER: TH 604

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- To prepare and maintain maps of the St. Paul–Minneapolis Metropolitan Area showing existing streets and roads, route system designations, railroads, political boundaries and other miscellaneous features. These maps provide the department and various other governmental agencies with basic mapping for general-purpose planning and operation functions.

METHODOLOGY:

- The Geographic Information and Mapping Unit maintains a digital base map for the entire Seven County Metropolitan Area. This set of 55 map sheets is referred to as the Metro Area Street Series. While prepared, maintained and usually plotted as 55 individual digital map files these sheets are structured to be seamless and can be mosaiced into any desired metro area coverage.

- These maps show all roads and streets in single line format. Route systems such as state trunk highways or county roads are portrayed by different weights as well as their respective route designation symbol and number. These maps also show all political boundaries, hydrography and railroads as well as selected references to the Public Land Survey System (section, township and range) and geodetic location (lat/long and state plan coordinates).

- The Computer-Assisted Design and Drafting (CADD) method was used to produce the Metro Street Series. Using high-resolution computer graphic workstation and Bentley MicroStation® software, a mapping technician "digitizes" all the various graphic elements contained within the computer map file. (See Task Title on Municipal Maps for explanation of digitizing.)

- USGS 1:24000 scale 7½ minutes quadrangle (quad) maps are used as the source for positioning control and the initial line-work to be digitized. Using the same digitizing techniques this "skeletal" line-work is then supplemented with other more up-to-date map information sources such as aerial photographs, road plans, satellite imagery, GIS files and other maps.

- Individual Metro Area Street Series map street coverage is formed by merging and "clipping" appropriate Mn/DOT "skeletal" quad files within the computer. The symbolical and text annotation needed to complete the map are also entered into the digital file. The finished map file is used to produce computer file plots. From this same digitizing, the Geographic Information and Mapping Unit has formatted a single map sheet file entitled the St. Paul–Minneapolis Area map.

Features depicted on this map include all state trunk highways and county state-aid highways, selected county roads and other local arterial roads, hydrography and political/civil boundaries. The graphic format and level assignment of this file resembles that of the county mapping activity. (See Task Title for County Maps.)

- Additionally this same Metro Area Street Series digitizing serves as the base for formatting individual municipal maps for those cities within the seven county metropolitan areas.

PRODUCTS:

- A 55-map sheet set (Metro Area Street Series) covering the entire Seven County St. Paul–Minneapolis Area at a scale of 1:24000 (one inch equal 2000 feet).

- A single sheet St. Paul–Minneapolis Metropolitan Area Map.

TASK TITLES: County Maps

ESTIMATED COST: $121,547

WORK AUTHORITY NUMBER: TH 606

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- To maintain a complete set of current, accurate, legible county maps at a scale of one inch equals to one mile. Prints and/or duplicate reproducible of these maps are used in the planning, location and design of projects by the Minnesota Department of Transportation. Additionally these maps are used as base maps by most state agencies, local and county government units, many federal agencies, private sector business application, such as transit and transportation industry, utilities, manufacturing etc., and by the general public for business or recreational purposes.

METHODOLOGY:

- The original, full-scale county maps are prepared and maintained in accordance with standards outlines in the FHWA Guide for the Highway Planning Map Manual (Volume 20, Appendix 25).

- Currently 126 map sheets are required to map Minnesota's 87 counties. These are produced on a uniform sheet size of 36″ x 56″ requiring from one to seven sheets for a single county.

- In the development of a new county map base, all possible current information is obtained form the following reliable sources:

1. County Maps
2. U.S Geographical Survey 1:24000 Quadrangle Maps
3. Mn/DOT Project Construction Plans
4. Aerial photography obtained from Mn/DOT Photogrammetric Unit, U.S, NAPP, Department of Natural Resources and Metropolitan Council
5. Road Status Reports from County and Municipal Council
6. Municipal and County Project Construction Plans
7. Mn/DOT Intermodal Programs Division, Transportation Data Section Road Note Data
8. Railroad and Public Utilities
9. Minnesota Department of Natural Resources

10. Various United States agencies such as Bureau of Land Management, Bureau of India Affairs, U.S. Forest Service, Federal Aviation Administration and Federal Highway Administration
11. Decisions from the U.S. Board of Geographic Names
12. Others

- After all data is collected the information is plotted using colors to denote various items. Colors are used to facilitate the later map preparation. Maps are prepared at a scale of one-inch equals to one mile, with the exception of six of the seven metropolitan are counties that are mapped at a scale of two inches equals to one mile using a polyconic projection. These are classified as full-scale maps.

- County map sheets are prepared utilizing Computer-Assisted Design and Drafting (CADD). The procedures for this process are described in the section on "Municipal Maps". This method is labor intensive in the initial stages but saves considerable time when making annual updates. The positional accuracy of the map product and the ability to seamlessly combine adjoining counties to create area maps are important benefits of this method. After completion and checking, copies are submitted to FHWA for approval.

- Minor revisions are received almost daily. These revisions are filed for reference and every county map is updated at least once each year to reflect these changes.

PRODUCTS:

- A complete set of digital county general highway maps covering the entire state.

TASK TITLES: State Maps

ESTIMATED COST: $50,087

WORK AUTHORITY NUMBER: TH 608

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- To prepare and maintain current, accurate and legible Minnesota maps depicting Minnesota's transportation systems statewide. These state maps are used by Mn/DOT for administrative and planning activities as well as by other federal, state and local government agencies in relating their concerns to Minnesota's transportation systems. Public utilities, private industry and businesses, and the general pubic also make use of these maps for their individual needs.

METHODOLOGY:

- State map originals are prepared and maintained in accordance with the standards outlines in the FHWA "Guide for a Highway Map Manual", Volume 20, Appendix 25.

- When Mn/DOT (formerly Minnesota Highway Department) began producing its own Official Highway Map in 1965, the base map showed the state and county lines and the state trunk highway system, and served as the base for all other departmental statewide mappings. (See State Map Products.) In 1992 work was completed on digitizing a new base map for the Official Minnesota Highway Map utilizing the capabilities of Computer-Assisted Design and Drafting (CADD).

- The new Official Highway map base was created in much the same manner as described in the section on "Municipal Maps". Digitizing was done using the U.S.G.S 1:100,000 quadrangle map series for Minnesota as the basis. Prior to digitizing all pertinent map data was supplemented and updated with current information from all available sources. With the completion of this project considerable flexibility is available in generating the necessary overlays for printing and the current map.

- Revision of the digitized base map and overlays to show current status is achieved by researching maps and data produced by other governmental mapping agencies and various other sources as listed under item number TH 606, County Maps. The Official Highway Map is updated every two years while the other map derivatives are updated as needed in accordance with the current map production schedules.

PRODUCTS:

- The Official Highway Map is produced biennially under this project. All of the cartography, photography text and artwork for this publication are produced in-house. Offset four-color printing is accomplished by low bid from a commercial printer. Mn/DOT funds are used for purchasing the number of maps needed by Mn/DOT distribution outlets at a unit price that covers the cost of printing. Other state agencies may also purchase quantities of maps at per unit printing cost by coordinating their purchase request with Mn/DOT through the Department of Administration.

- The state trunk highway system map and the state county outline map were prepared by digitizing U.S. Geological Survey 1:100,000 scale maps. Appropriate map features from these 69 individual source maps were merged into one digital file of statewide coverage for computer plotting at any desired scale

- Other miscellaneous state maps that portray transportation related data statewide are either derivatives of or overlays to the state trunk highway system map. These types of maps are plotted and/or printed on as needed basis.

TASK TITLES: GIS BaseMap

ESTIMATED COST: $244,555

WORK AUTHORITY NUMBER: TH 609

WORK PERFORMED BY: Geographic Information and Mapping Section

OBJECTIVES:

- To prepare, maintain current and accurate statewide GIS BaseMap. The GIS BaseMap is used by Mn/DOT (C.O. and districts), federal, state, regional and local governments, Universities (e.g. University of Minnesota, Mankato State, Ohio State, Michigan State), corporations (e.g. utilities, engineering businesses, consultants) and the general public.

METHODOLOGY:

- *BaseMap* was developed to fill the need at Mn/DOT for a continuous and statewide GIS base map. *BaseMap* is the product of a number of efforts including the standards committees, user group meetings and pilot projects as well as the GIS Specialists who worked to build and digitize it.

- The original line work was developed by digitizing the USGS 1:24,000 quadrangle series. Using the ESRI's Arc/Info, it was then merged and separated into 23 coverage containing roadways, highways, cash, muni, etc. Attributes were added to many of the coverage. In 2001, the Arc/Info coverage format was changed to the ESRI shape file format for easier use by other GIS software products.

- Revision of the BaseMap to show the current status is achieved by researching maps and data produced by other governmental mapping agencies and various sources as listed under item number TH 606, County Maps.

- GIS allows for geographical transportation related elements to be identified and analyzed with the transportation networks of highways, rail, pipelines and waterways. It also allows for the use of "windowing in" on a statewide map down to regional, district, county or even corridor specific maps. Users are able to display and analyze data from many sources and in any of the several location reference systems. These additional capabilities and resulting flexibility produce a better picture of transportation interrelationships within the State of Minnesota. The BaseMap is under continuous development and it will be enhanced and maintained by Mn/DOT.

PRODUCTS:

From 1996 through 2000, the State of Minnesota BaseMap was produced annually and distributed via CD-ROM. Beginning in 2001, the BaseMap was made available via the Internet on Mn/DOT's Web site at: http://www.dot.state.mn.us/tda/basemap/index.html.

OFFICE OF

TRANSIT

TASK TITLES: Transit Program Planning

ESTIMATED COST: $152,860

WORK AUTHORITY NUMBER: TH 301

WORK PERFORMED BY: Office of Transit

OBJECTIVES:

- To prepare transit, para-transit, and rail transit program plans and reports in cooperation with participating agencies and staff.
- To analyze, document and recommend transit, para-transit, and rail transit program policies that encourage coordination and cost-effectiveness of transit services.
- To develop, evaluate and recommend alternative program strategies and performance criteria.

METHODOLOGY:

- Produce an annual report that concisely summarizes public transit activities.
- Prepare specialized reports and present results to internal and external customers. Legislative and regulatory development will be monitored.
- Develop a transit information network that will maintain information on all transit services in the state in order to further coordination and cost effectiveness of public transit services. Alternative strategies are developed and analyzed when issues arise.
- Establish performance measures that are applicable to the various transit services and providers. Policies and other considerations are combined and documented as part of the overall program strategy implementation.
- Review and update a variety of policy and planning documents that are used by the department and external customers.
- Maximize the transportation investment in transit projects.
- Support office-planning activities.
- Produce results as needed and to be used as a focus for testing new approaches and implementation for practical improvements in transit services.

PRODUCTS:

- Annual Report
- Policy Analysis Reports
- Transit Issue Presentations
- Public Education & Involvement Plans
- Project Oversight
- Quarterly Progress Reports
- Semi-annual DBE Reports

- In-Transit Newsletter/Transit Bulletin
- Office of Transit Website
- Transit System Safety Plans

TASK TITLES: Transit Research and Program Evaluation

ESTIMATED COST: $145,140

WORK AUTHORITY NUMBER: TH 302

WORK PERFORMED BY: Office of Transit

OBJECTIVES:

- To research and prepare a variety of specialized reports, site studies and surveys to ensure that adequate information is available to identify and evaluate alterative options involving numerous transit issues.
- To provide technical assistance to transit programs and project managers on specific transit planning and research projects.
- To develop research programs using a comprehensive computerized transit program database and specialized software.

METHODOLOGY:

- Prepare specialized reports on current transit topics.
- Analyze market characteristics for changing transit service area.
- Conduct site studies for existing public transit systems.
- Develop, implement and analyze on-board transit surveys to continually update ridership profiles.
- Analyze trends (economic, social, demographic, etc.) that have current and/or potential impacts on public transit via utilization of specialized computer software.
- Support office research and program evaluation activities.

PRODUCTS:

- Program Performance Reports
- System Performance Evaluations
- Demographic Trend Analysis Reports
- Site Studies for Transit Systems
- New Starts Service Designs/System Service Redesigns
- Transit Peer Group Analyses

- Transit Needs Assessments
- DBE Program Technical Assistance
- Drug and Alcohol Program Technical Assistance

TASK TITLES: Bike and Pedestrian Ways Planning

ESTIMATED COST: $396,738

WORK AUTHORITY NUMBER: TH 117

WORK PERFORMED BY: Office of Transit, Bicycle and Pedestrian Section

OBJECTIVES:

- To promote and facilitate the delivery of non-motorized modes into our multi-modal transportation system

METHODOLOGY:

- This objective will be achieved by devoting staff time to the following sections:

  - Policy Development and Planning
    This section is responsible for the creation, review, and updating of a variety of policy and planning documents that are used by the department and external customers in the integration of non-motorized modes in Minnesota's transportation system.

  - Outreach and Awareness
    This section of staff time is devoted to managing the relationship between Mn/DOT and its customers

  - Training
    In a typical year the section works with a broad base of transportation professionals to provide them with tools to apply the principals of non-motorized modes to their transportation planning and projects. Training also provides the additional benefits of allowing staff to meet people in the field and gain immediate and direct customer feedback that in turn improves the categories of consulting and policy development.

  - Consulting
    The staff is frequently sought out for assistance in their areas of technical expertise. This work is also an important source of customer feedback that allows us to have first hand experience with what is working and being used as well as an effective way for our staff to increase our pool of shared knowledge.

  - Research
    This section manages and participates in research to promote the application and benefits of non-motorized modes. The section also serves as the Technical Liaison on Tourism/Transportation Research, the U of M (CTS) Environmental Research Council, and provides council to the Hubert Humphrey Institute's Research on Cost Benefits of Bicycling and their work on Bicycle Safety (Toward Zero Deaths).

- Staff Development and Support
  This section reflects the time that is spent in managing resources and ensuring continued growth and development as a departmental resource. These activities include resource management, internal communication, work planning, training, conference participation, and other professional development

PRODUCTS:

- Non-motorized Modal Plan (Bike, Ped, Telework and Transportation Action Model)
- Technical memoranda and Policy
- Highway Project Development Process: Part II, Section D, Subject Guidance: Bikeways and Pedestrians
- Bicycle and Pedestrian Design Guidelines
- Mn/DOT's Design Advisory Committee
- Bonding Projects: Bicycle and Pedestrian Accommodation Advisories
- Federal Surface Transportation Program Solicitation Process for Metro Area
- State Bicycle Maps
- Metro Bicycle Mapping and System Plan
- Mississippi River Trail
- State Bicycle Advisory Committee
- National Bike and Pedestrian Coordinators (AASHTO Task Force on Non-motorized Transportation)
- Community Bike and Pedestrians events
- Bike Facility Design Technical Assistance
- Participation in State Planning Groups
- Modal representation checklist
- Transportation Plan Performance Measures
- Requested plan reviews
- Economic impact of Bicycling in Minnesota- University of Minnesota
- Cost/Benefit of Bicycle Facilities – Hubert Humphrey Institute's National Study
- Bicycle Safety Education Campaign

OFFICE OF

FINANCIAL

MANAGEMENT

TASK TITLES: Highway Statistics

ESTIMATED COST: $31,500

WORK AUTHORITY NUMBER: TH 401

WORK PERFORMED BY: Financial Operation Section General Ledger Unit

OBJECTIVES:

- To furnish information on motor vehicle registration, fees and taxes, driver license regulation and fees, and fuel consumption. This data is used to develop motor vehicle and motor fuel usage for forecasting future highway user imposts and determining vehicle and fuel tax use in the formulation of highway policy, and administration of highway matters, informational use by legislators, public officials and the general public.

METHODOLOGY:

- The procedures used to obtain statistical and financial data for reporting purposed are as follows:

    - Motor vehicle registration and drivers' license data are received on an annual basis from the registrar of motor vehicles, Department of Public Safety. These data are researched, analyzed and compiled for use in the preparation of reports in accordance with instructions contained in Chapters 3, 4 and 5 of FHWA "A guide to Reporting Highway Statistics".

    - Motor fuel statistics are received monthly form the Petroleum Tax Division, Department of Revenue. Upon receipt of this information, monthly computations are made and place on tubular form for gasoline and special fuel gallonage. These statistics are used in the preparation of annual reports and in accordance with Chapter 2, FHWA "A guide to Reporting Highway Statistics".

    - Financial reports are prepared from information acquired from the Department's Financial Operations Section records. These records are extensively examined and tabulated. They are prepared for assistance and used in the preparation of annual reports in accordance with the guidelines contained in Chapters 8 and 9 of FHWA "A Guide to Reporting Highway Statistics".

    - Local government financial reporting is based on information furnished by all cities, towns and counties on an annual basis, which is currently prepared by the Governmental Information Division of the State Auditor's Office. The annual completed workup is submitted to the Department's Financial Operations Section for approval. It is then forwarded to the Federal Highway Administration in accordance with instructions in Chapter 10 of FHWA "A Guide to Reporting Highway Statistics".

- Travel takes place in connection with training workshops, seminars, etc. that are scheduled annually for increasing effectiveness and efficiency of financial and statistical reporting.

PRODUCTS:

FHWA-531	State Highway Income
FHWA-532	State Highway Expenditures
FHWA-534	Capital Outlay and Maintenance Expenditures
FHWA-536	Local Highway Finance Report – cities, counties and townships
FHWA-541	State Transportation obligations issued during year and allotment of Proceeds
FHWA-542	Status of State Transportation Debt
FHWA-543	State Transportation Sinking Funds and Debt Service transactions
FHWA-551M	Monthly Motor-fuel Consumption
FHWA-561	State Motor-fuel Tax Receipts and Initial Distribution by collecting agencies
FHWA-562	State Drivers' Licenses and Fees
FHWA-566	State Motor Vehicle registration fees and other receipts, initial distribution by collecting agencies
FHWA-571	Receipts from State Taxation of Motor Vehicles operated for hire and other motor carriers

These reports are used as a basis for the statistical data and the U.S. Department of Transportation's annual publication "Highway Statistics."

OFFICE OF

TRAFFIC, SECURITY AND

OPERATIONS

TASK TITLES: Special Data Summaries

ESTIMATED COST: $21,626

WORK AUTHORITY NUMBER: TH 501

WORK PERFORMED BY: Office of Traffic, Security and Operations/Intelligent Transportation Systems (OTSO/ITS)

OBJECTIVES:

- To monitor highway speeds and develop speed characteristics at various sites located on five highway categories. Data summaries are reported quarterly and annually.

METHODOLOGY:

- Data collection procedures are developed by the Office of Traffic, Security and Operations (OTSO/ITS) and implemented through eight district traffic engineers. Monitoring 24-hour period is desirable and therefore Mn/DOT uses a combination of automated traffic recorder stations and weigh-in-motion stations at sites with speed monitoring equipment accessible by telephone telemetry. Different software programs download the data, format it and finally analyze and print the reports. Data is still visually screened to verify accuracy and potential hardware problem. The TRIM office maintains the hardware and OTSO/ITS does the data analysis. This automated methodology has helped decrease the number of person hours required compared to previous years.

PRODUCTS:

- A complete file of speed characteristics on each category of highways – These files is used to develop quarterly and annual report to evaluate motorists' compliance with speed limits.

- Data may also be used to evaluate effectiveness of enforcement and public awareness programs. Speed trends also play a role in evaluating accident trends.

TASK TITLES: Crash Surveillance

ESTIMATED COST: $135,708

WORK AUTHORITY NUMBER: TH 502

WORK PERFORMED BY: Office of Traffic, Security and Operations

OBJECTIVES:

- To provide crash data to reveal high crash locations and over represented crash characteristics on all roads and streets in the State. This information relates to the highway facility, vehicle, environment and human factors and provides input for establishing highway safety needs and priorities for development of a long-range safety improvement program.

METHODOLOGY:

- Traffic crashes, reported per state law by investigating officers and citizens are processed by DPS and are on-line no later than ninety days afterward. A wide range of variables from the vehicle, injury, roadway, driver and environment support the federal emphasis of crash analysis and safety counter measure development. Various TIS software programs are executed by OTSO and a report is developed for a requesting agency or internal application.

PRODUCTS:

- Semi-annual crash reports will be prepared for road authorities.
- Comprehensive reports are prepared using district boundaries for comparative analysis of accidents within specified areas or highway categories.
- Customized reports can be developed for technical or non-engineering disciplines upon request.
- Crash rates can be calculated for isolated intersections, highway categories or statewide systems as designated by the scope of the requester.
- This timely crash data and summarized reporting provides road authorities an objective basis for prioritizing and developing safety countermeasures, dedicated enforcement efforts and also minimizes tort liabilities.

OFFICE OF

STATE AID

TASK TITLES: County State-Aid Highway Needs Study

ESTIMATED COST: $309,950

WORK AUTHORITY NUMBER: TH 701

WORK PERFORMED BY: State Aid

OBJECTIVES:

- To compile a computerized record of the entire County State-Aid Highway System with specific attention given to mileage and money needs. "Money needs" is defined as the construction cost required to improve the county state-aid system to approved standard. Based on the directions from the County Engineers Screening Board, each county's mileage and annual money needs is presented to the Commissioner of Transportation. Using this information and pursuant to Minnesota Statues, Chapter 162, the Commissioner apportions the County State-Aid part of the road user fund to the various counties.

METHODOLOGY:

- Each county engineer is required annually to update his needs study based on the construction accomplished, system revision, traffic, need reinstatement and any other necessary changes. With these updates, the computer record is revised and a new completely updated needs study is created.

- In order to keep the needs study prices current each year, a five-year average unit price study is produced. Using the results from this study, the County Engineers Screening Board develops new unit prices for inclusion into the needs study.

- Each year approximately 25% of the counties have their traffic counted. This information arrives at the Data Management Section and is transfer onto the records in the needs study.

- All the above data is presented to the County Engineers Screening Board for the use of making an annual recommendation for mileage, lane/miles and money needs to the Commissioner of Transportation.

- The entire needs study process (computer programs, etc.) is being reviewed and rewritten. This will take several years and will result in increased budget numbers.

PRODUCTS:

- Two County Engineers Screening Board Reports

- One County State-Aid Apportionment Booklet

- Miscellaneous legislative, auditor and client requests

TASK TITLES: Municipal State-Aid Street Needs Study

ESTIMATED COST: $305,503

WORK AUTHORITY NUMBER: TH 702

WORK PERFORMED BY: State Aid

OBJECTIVES:

- To maintain the Municipal State-Aid Needs Studies which result in the annual determination of State-Aid Apportionment in municipalities over 5,000 populations according to Minnesota Statutes, Rules and Screening Board Directives.

METHODOLOGY:

- The city engineers annually report the construction accomplishments, system revisions, certification of mileage and status corrections as outlines in the State-Aid Manual. Also the Twin Cities Metropolitan area traffic data is updated every two years and the out-state cities every four years. These items are processed through a computer program together with unit prices, which are annually updated and approved by the Municipal Screening Board at their spring meeting.

- The resulting needs and tentative apportionments are reported to the Municipal Screening Board at their Fall meeting. Prior to November 1 each year, the board recommends the money needs to be used by the Commissioner of Transportation for the following year's allotment to the municipalities over 5,000 population. The actual allotment is made by the Commissioner of Transportation in January of the following year when the funds available are known.

PRODUCTS:

- Two reports to the Municipal Screening Board for use in making annual recommendations to the Commissioner of Transportation

- One annual "Municipal Apportionment" report to the municipalities over 5,000 populations showing their annual allotment and the methods of determining the amounts.

OFFICE OF

TECHNICAL SUPPORT

TASK TITLES: Cultural Resources Investigations

ESTIMATED COST: $1,249,663

WORK AUTHORITY NUMBER: TH 801 through TH 899

WORK PERFORMED BY: Office of Technical Support

REFERENCE NUMBERS:

T-Contract Program

Agreement Number: 75098	Agreement Number: 75099
Agreement Number: 75100	Agreement Number: 75101
Agreement Number: 75102	Agreement Number: 75103

OBJECTIVES:

- To preserve and/or document cultural resources subject to disruption due to proposed highway improvements. This includes the archaeological survey of prehistoric and historic sites, historic research, geo-morphological studies, and/or archaeological data recovery. The information from these investigations is included in the environmental impact study of highway corridors. Results are also forwarded to the State Archaeologist and the State Historic Preservation Office (SHPO).
  - Cultural resource investigations are done in conformance with:
  - Historic Preservation (35 CFR 800
  - National Historic Preservation Act of 1966 PL 89-665) as amended
  - Department of Transportation Act of 1966 (PL 89-670)
  - Executive Order 11593
  - Archaeological and Historic Preservation Act of 1974 (PL 93-291)
  - Title 36 of the Code of Federal Regulations (CFR) Parts 60-66 and 800
  - Native American Graves Protection and Repatriation Act of 1990 (PL101-601)
  - Secretary of the Interior's Standards and Guidelines for Archaeology and Historic preservation Activities. As published in the Federal Register in September 29th, 1983, Volume 248, No. 190 Part IV (48 FR 44716 through 44740)
  - Association of Iowa Archaeologist's Guidelines for Geomorphological Investigation in Support of Archaeological Investigations (1992)
  - State Historic Preservation Office (SHPO) Guidelines for Archaeological Projects in Minnesota
  - Manual for Standing Structures
  - Minnesota State Comprehensive Plan

- Minnesota state historic preservation regulations and guidelines and Secretary of the Interior and/or SHPO standards, guidelines, and directives in force during the period of work performance.

METHODOLOGY:

- Project which may be affected by proposed highway improvements are identified through the districts, counties and municipalities. These projects are assigned to vendors in the T-contract program on a rotational basis based on the vendor's expertise, workload and availability. Projects are defined by type of investigation and phase as required by SHPO after review of the proposed project area. Types are geomorphology, historical, archaeological and architectural phases are defined as:

  Phase I – Initial Reconnaissance

  Phase II – Intensive Survey (Determine Significance)

PRODUCTS:

- Monthly progress reports, field notes are submitted.
- Pictures and documentation of historic sites if historic research is cited.
- If archaeology is identified, artifacts are curated.
- Final reports and conclusion of research and findings.

See also enclosed Special Conditions of agreement

OFFICE OF

FREIGHT AND

COMMERCIAL VEHICLE

OPERATIONS

TASK TITLES: Freight Planning, Studies and Data Management

ESTIMATED COST: $326,186

WORK AUTHORITY NUMBER: TH 220

WORK PERFORMED BY: Freight Planning & Program Development

OBJECTIVES:

- To improve our knowledge and integration of freight transportation into our policy, long range planning and investment processes. Make better decisions that improve or augment freight transportation service productivity and safety.
- To improve freight transportation by providing information, direction and service to internal and external customers.
- To provide for and facilitate cooperative action, private or public, to improve Intermodal freight transport specifically and freight transportation in general.

METHODOLOGY:

- By increasing Mn/DOT's basic knowledge of freight transportation and improving the comprehension of freight transport's relation to Minnesota's economic, social and environmental health.
- Consideration of freight transportation will better integrate into Mn/DOT's planning, programs, investments and system management.
- Conduct community flow studies.
- Maintain and improve the Mn/DOT freight facilities database.
- Staff utilizes the Minnesota Freight Advisory Committee (MFAC) comprised of private industry and public sector members to provide and intermodal perspective and foster public/private cooperation.
- Enhance the efficiency of goods movement in Minnesota and support economic growth through policies and programs that optimize a multimodal transportation system.

PRODUCTS:

- Develop and update freight performance (rural and metro w/cluster approach) measures as well as supporting and recommending other statewide transportation measures.

- Provide and articulate freight related policies, issue and trend analysis that reflected a district, statewide and system level perspective.
- Provide both the frame work and information necessary for districts and regions to plan, improve and develop transportation facility information that account for interregional corridor and trade center influences, function as systems and area consistent with State goals.
- Provide information and stimulate discussion to guide statewide policy development and also local regional transportation investment decisions as well.
- Maintain a high level of freight transportation expertise available to all levels of the Department to provide advice and assistance on freight issue resolution.
- Maintain current freight information, commodity flows and database information
- Provide commodity flow data and information to improve the level of understanding of customer needs, Minnesota markets, transportation demand and freight's relationship to economic activities.
- Concentrate on the broader statewide, multi-state national/internal flows while working with MPOs, RDCs, districts and Metro division to develop regional and localized information.
- Develop techniques, report formats, mapping capabilities or other ways to turn "data" into information useful in the planning and investment decision process.
- Initiate, support and recommend freight research
- Provide development of research proposals and stay current with freight related research efforts regionally and nationally. Coordinate within Mn/DOT and provide freight information to internal and external customers.

APPENDIX B:

DESCRIPTION OF

RESEARCH STUDIES

DESCRIPTION OF RESEARCH STUDIES

STATE SP&R RESEARCH

RSS - RESEARCH PROJECTS, TECHNOLOGY TRANSFER, IMPLEMENTATION, SPECIAL PROJECTS & ADMINISTRATION - SPR-0001(044)

This project provides for the preparation of proposals, detailed work outlines and cost estimates for research studies to be submitted for the SP&R Work Program. This includes incidental and miscellaneous expenses which occur during the course of the year and which are pertinent to the overall research, development and implementation efforts. Included will be the costs of support staff and researchers needed to administer and monitor the studies in the State's Research Program. These studies can be found in this section. Many of these studies are part of the Mn/ROAD and IVHS research effort. This project also provides for attendance and participation in various meetings and workshops including the annual FCP conference, which contribute to a better understanding of current problems and fosters the exchange of technical information and leads to improved research management practices.

The studies in the Cooperative Research description section follow the format of the recently established Transportation Pooled Fund web site (www.pooledfund.org). The information has been edited to include only the pertinent information relevant to Mn/DOT's involvement. However, in addition to the information below the web site also has, or links to, project documents such as work plans, reports, project updates, etc. An individual can also sign up to be notified of new studies as they are posted. The site also has a browse and search feature.

COOPERATIVE RESEARCH

Study Number:	0002(207)
Status:	Contract signed
Title:	Transportation Management Center Pooled Fund Study
Lead Agency:	Federal Highway Administration
Study Partners:	AZ, CA, CT, DC, DE, FHWA, FL, GA, I-95 Corridor Coalition, IL, IN, KS, MI, MODOT, NE, NM, NV, NY, PA, RI, VA
Contract Amount:	$0
100% SP&R Approval:	Approved

Objectives:	The goal of the Transportation Management Center (TMC) Pooled Fund Study is to assemble regional, state, and local transportation management agencies and the Federal Highway Administration (FHWA) to (1) identify human-centered and operational issues that are common among TMC operators and managers; (2) suggest approaches to addressing identified issues; (3) initiate and monitor projects intended to address identified issues; (4) disseminate results; and (5) assist in solution deployment.
Comments:	Desired minimum commitment is $25,000. Level of commitment may vary, based on size and type of agency (e.g. county and city).

Study Number:	0002(208)
Status:	Contract signed
Title:	**Pavement Subgrade Performance Study**
Lead Agency:	Federal Highway Administration
Study Partners:	AK, AL, CA, CT, FL, GA, ID, IN, KS, MN, MT, ND, NE, NH, NY, OH, OR, PA, TX
100% SP&R Approval:	Pending Approval
Objectives:	The objectives of the study are to develop an improved mechanistic subgrade failure criterion for pavements; to evaluate the effect of environment (seasonal variability) on resilient material properties
Comments:	Ongoing. Six of the 12 test sections of pavement are in the process of completing the construction of two test sections. Testing of these test sections is expected to begin in early October 2002.

Study Number:	0003(017)
Status:	Contract signed
Title:	**Midwest States Pooled Fund Crash Test Program**
Lead Agency:	Nebraska Department of Roads
Study Partners:	CT, FL, IA, KS, MN, MODOT, MT, NE, OH, SD, TX, WI
Contract Amount:	$0
100% SP&R Approval:	Approved
Objectives:	To crash test highway roadside appurtenances to assure that they meet criteria established nationally.
Comments:	Ongoing: Study has proved to be successful to this point, and will remain active going forward. For more information please refer to the Midwest Roadside Safety website: http://www.mwrsf.unl.edu/

Study Number:	0003(020)
Status:	Cleared by FHWA
Title:	**IVHS Study (ENTERPRISE)**
Lead Agency:	Iowa Department of Transportation
Study Partners:	AZ, CO, IA, KS, MI, MN, NC, VA, WA
Contract Amount:	$0
100% SP&R Approval:	Pending Approval
Objectives:	To investigate and promote IVHS approaches and technologies that is compatible with other national and international IVHS initiatives.

Study Number:	0003(042)
Status:	Cleared by FHWA
Title:	**Aurora Program**
Lead Agency:	Iowa Department of Transportation
Study Partners:	IA, IL, MN, NY, PA, SD, VA, WI
Contract Amount:	$0
100% SP&R Approval:	Approved
Objectives:	Aurora is an international program collaborative research, development and deployment in the field of road and weather information systems (RWIS), serving the interest and needs of public agencies. The Aurora vision is to deploy RWIS to integrate state-of -the-art road and weather forecasting technologies with coordinated, multi-agency weather monitoring infrastructures. It is hoped this will facilitate advanced road conditions and weather monitoring and forecasting capabilities for efficient highway maintenance, and provision of real-time information to travelers. (updated 7/7/01)
Comments:	Study is ongoing and will continue for the foreseeable future. Members contribute funds annually; propose research projects on RWIS-related projects (Road Weather Information Systems); manage contracts for the research; and prepare reports/submit results for publication. One of Aurora's goals is to provide guidelines for RWIS implementation and usage. Refer to http://www.aurora-program.org/for project updates. (updated 2/7/02)

Study Number:	0003(049)
Status:	Contract signed
Title:	**Urban Mobility Study**
Lead Agency:	Texas Department of Transportation
Study Partners:	CA, CO, MD, MN, NY, OH, OR, PA, TX, WA
Contract Amount:	$0
100% SP&R Approval:	Approved
Objectives:	1) Form Steering Committee, which will decide on the congestion reduction methods to include in the new methodology and which cities will be included in study. 2) Continuously Refine the Congestion Index to include multimodal operations or regional operational improvement programs (i.e., ITS service, incident detection and response, travel demand management, transportation systems management, and computerized signal control coordination. 3) Maintain Existing Congestion Measures. 4) Add Additional Urban Areas. 5) Respond to Requests for Mobility Data.
Comments:	Ongoing. States are still encouraged to participate. (2/7/02)

Study Number:	0003(073)
Status:	Cleared by FHWA
Title:	**Micro-Surface Mix Design Procedure**
Lead Agency:	California Department of Transportation
Study Partners:	CA, GA, IL, KS, MI, MN, MODOT, ND, NE, NH, NY, TX, VT
Contract Amount:	$0
100% SP&R Approval:	Approved
Objectives:	Recent reports from the FHWA and Texas A&M University highlight the apparent problems with using existing methods for Micro-Surfacing and suggest that comprehensive mix design and analysis procedures need to be developed. It is believed that a Micro-Surfacing Mix design procedure is essential to elevate this surface treatment method to the highest level of acceptance. The procedure should establish the level of components in the mixture and the tests run must predict performance. The mix design procedure should address several specific aspects of micro-surfacing.
Comments:	New Project (3/15/99) (updated 7/7/01)

Study Number:	0003(074)
Status:	Cleared by FHWA
Title:	**Pavement Research and Technology**
Lead Agency:	Washington State Department of Transportation
Study Partners:	MN, TX, WA
Contract Amount:	$0
100% SP&R Approval:	Approved
Objectives:	Under this project, each state will create funding to allow technical staff and university researchers to participate in a series of project meetings focused on sharing information, identifying critical issues of mutual interest, developing plans for joint research and testing, and educating transportation professionals on the latest developments in the design, construction, reconstruction and maintenance of highway pavements. (updated 7/7/01)
Comments:	The participating states have met 11 times to discuss pavement issues and to visit various venues such as Waterways Experiment Station, National Center for Asphalt Technology, and Western Research Institute. The project will run through the year 2005. (updated: 10/16/03)

Study Number:	0003(095)
Status:	Cleared by FHWA
Title:	**Establishment of a Program to Support the Research, Development, and Deployment of Cooperative Vehicle-Highway Automation Systems (The Phoenix Project)**
Lead Agency:	California Department of Transportation
Study Partners:	CA, FL, GA, IL, MODOT, NY, UT, WA
Contract Amount:	$0
100% SP&R Approval:	Approved
End Date:	05/31/2003
Objectives:	Within national Intelligent Transportation Systems (ITS) activities, the long-term planning, research, development, and deployment of the next generation of surface transportation system has not been fully considered. Complex challenges related to traffic congestion, safety and environmental impact are not being adequately addressed and can no longer be solved by traditional highway technologies, or even by deploying mainstream ITS. These challenges threaten to adversely affect the ability of transportation infrastructure operators to provide for

	the mobility of people and goods. One ITS area that has the potential to significantly alleviate these more complex challenges is Cooperative Vehicle-Highway Automation Systems (CVHAS). Please see www.cvhas.org for more details.
Comments:	Active. Study on National Highway Automation is currently being done in Illinois. This Chicago study (Chicago Automated Bus way and Chicago Automated Freight Movement study) will look to automate buses and trucks in the Chicago lakefront area. (2/5/02)

Study Number:	TPF5(001)
Status:	Cleared by FHWA
Title:	**Soil Mixing Methods for Highway Applications**
Lead Agency:	Federal Highway Administration
Study Partners:	CA, FL, IL, KS, NV, NY, WI, WY
Objectives:	To develop improved design and construction control methods for the use of soil mixing techniques on highway projects where conventional foundation support and/or ground retention methods are either too expensive or inappropriate due to soil or site conditions.
Comments:	Study has been initiated and a Technical Working Group (TWG) was established to provide direction and oversight for all project activities. TWG held a kickoff meeting in July 2001 to develop a comprehensive plan to accomplish the goals and objectives of this research project. SOW and prospectus are under development. (2/04/02)

Study Number:	TPF5(021)
Status:	Contract signed
Title:	**Base Funding for the North Central Superpave Center**
Lead Agency:	Indiana Department of Transportation
Contract Amount:	$125,000
100% SP&R Approval:	Approved
Objectives:	This pooled fund project will provide for continued operation of the North Central Superpave Center to assist agencies and industry with Superpave implementation and hot mix asphalt issues. The NCSC will provide technical assistance, training,

	communication, and research and development work to meet the needs of the region.
Comments:	The North Central Superpave Center Steering Committee meeting was held at the end of January 2003 in which this study was discussed. Funds and state partners are currently being solicited for participation.

Study Number:	TPF5(042)
Status:	Contract signed
Title:	**Investigation of the Long-Term Effects of Magnesium Chloride and Other Concentrated Salt Solutions on Pavement and Structural Portland Cement Concrete**
Lead Agency:	South Dakota Department of Transportation
Study Partners:	ID
Contract Amount:	$600,000
100% SP&R Approval:	Pending Approval
Objectives:	To investigate the short and long-term effects of high concentrations of salts (including magnesium chloride) 1. To determine the long-term effects of concentrated solutions of magnesium, sodium and calcium chloride as well as CMA or other alternative liquid deicers on durable Portland cement concrete. 2. To estimate the potential for reduction in performance and service life for pavements (jointed plain, reinforced and continuously reinforced) and structures subjected to various concentrated deicing brines. 3. To identify alternative protective or deicing/anti-icing strategies which minimize potential impacts to durable Portland cement concrete while providing acceptable winter maintenance results that are being increasingly applied to concrete during anti-icing and de-icing activities.
Comments:	Study is being initiated and funds are being solicited from potential project partners.

Study Number:	TPF5(045)
Status:	Cleared by FHWA
Title:	**Performance Guidelines for the Selection of Hot-Pour Crack Sealants**
Lead Agency:	Virginia Department of Transportation

Study Partners:	CT, DC, GA, MI, MN, NH, NJ, NY, RI, TX, VA
100% SP&R Approval:	Approved
Objectives:	This project will result in extended pavement surface life and thus reduced roadway rehabilitation and maintenance costs. Guidelines for sealant selection are being proposed because the durability of crack sealants used on the North American roadways is often shorter than expected, even though crack sealing is the most common method of preventative maintenance.

Study Number:	TPF5(051)
Status:	Contract signed
Title:	**Construction of Crack-Free Concrete Bridge Decks**
Lead Agency:	Kansas Department of Transportation
Study Partners:	DE, FHWA, ID, IN, KS, MI, MN, MODOT, MS, MT, ND, NH, OK, SD, TX, WY
Contract Amount:	$950,000
100% SP&R Approval:	Pending Approval
Objectives:	To implement the most cost-effective techniques for improving bridge deck life through the reduction of cracking.

Study Number:	TPF5(054)
Status:	Contract signed
Title:	**Development of Maintenance Decision Support System**
Lead Agency:	South Dakota Department of Transportation
Study Partners:	IA, IN, MN, ND, SD
Contract Amount:	$186,547
100% SP&R Approval:	Pending Approval
Objectives:	1) To assess the need, potential benefit, and receptivity in participating state transportation departments for state and regional Maintenance Decision Support Systems. 2) To define functional and user requirements for an operational Maintenance Decision Support System that can assess current road and weather conditions, forecast weather that will affect transportation routes, predict how road conditions will change in response to candidate maintenance treatments, suggest optimal maintenance strategies to maintenance personnel, and evaluate the

	effectiveness of maintenance treatments that are applied. 3) To build and evaluate an operational Maintenance Decision Support System that will meet the defined functional requirements in the participating state transportation departments. 4) To improve the ability to forecast road conditions in response to changing weather and applied maintenance treatments.

Study Number:	TPF5(055)
Status:	Cleared by FHWA
Title:	**Rapid Bridge Replacement Techniques**
Lead Agency:	Texas Department of Transportation
100% SP&R Approval:	Approved
Objectives:	Identify the optimum combination of materials and techniques to be used to rapidly repair or replace damaged bridges, including design and construction contract incentives for accomplishing such work
Comments:	Solicitation distributed with a reply date of August 15, 2002.

Study Number:	TPF5(066)
Status:	Cleared by FHWA
Title:	**Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements**
Lead Agency:	Iowa Department of Transportation
Study Partners:	GA, IA, IN, KS, LA, MI, MN, MODOT, NC, NY, OH, TX, WI
100% SP&R Approval:	Approved
Objectives:	To seek ways to optimize materials selection and construction methods to improve the longevity of Portland cement concrete pavements.
Comments:	Solicitation due date: December 31, 2002

Study Number:	TPF5(068)
Status:	Cleared by FHWA
Title:	**Long-Term Maintenance of Load and Resistance Factor Design Specifications**
Lead Agency:	Iowa Department of Transportation
Study Partners:	AK, AL, AR, CA, CO, CT, DE, FL, GA, HI, IA, ID, IN, KS, KY, LA, MA, MD, ME, MI, MN, MODOT,

	MS, MT, NC, ND, NE, NH, NJ, NV, NY, OH, OK, OR, PA, PR, SC, SD, TN, TX, UT, VA, VT, WA, WI, WV, WY
100% SP&R Approval:	Approved
Objectives:	To provide timely assistance to the AASHTO Highway Subcommittee on Bridges and Structures in interpreting, implementing, revising, and refining the AASHTO load and resistance factor documents

Study Number:	TPF5(069)
Status:	Contract signed
Title:	**Core Program Services for a Highway Research, Development, and Technology Program, TRB Fiscal Year 2004**
Lead Agency:	Federal Highway Administration
Study Partners:	AL, CT, IL, IN, ME, MS, MT, ND, NV, OR, PA, TX, WV, WY
Contract Amount:	$3,952,735
100% SP&R Approval:	Approved
Objectives:	To provide a mechanism for State transportation departments to support the TRB's core program and services.
Comments:	Commitments for TRB fiscal year 2004 (July 2003 - June 2004) have been completed. Obligations were made by participating States and the funds have been applied to the grant with TRB.

Study Number:	TPF5(070)
Status:	Cleared by FHWA
Title:	**Second International Conference on Accelerated Pavement Testing**
Lead Agency:	Minnesota Department of Transportation
100% SP&R Approval:	Approved
Objectives:	To conduct the Second International Conference on Accelerated Pavement Testing (APT) on September 19-22, 2004, in Minneapolis, MN.

Study Number:	TPF5(073)
Status:	Cleared by FHWA
Title:	**Portable Non-Intrusive Technologies**
Lead Agency:	Minnesota Department of Transportation
Study Partners:	CA, ID, LA, MT, WI
Contract Amount:	$75,000

100% SP&R Approval:	Approved
Objectives:	To provide data collection practitioners with a cost-effective design of a PNIT system and an independent assessment of a variety of detection technologies.

Study Number:	TPF5(078)
Status:	Cleared by FHWA
Title:	**Upper Midwest Freight Corridor Study**
Lead Agency:	Ohio Department of Transportation
Study Partners:	IA, IL, IN, MN, OH, WI
100% SP&R Approval:	Approved
Objectives:	To establish a regional approach for improving freight transportation on in the Upper Midwest based on a multi-state, multi-jurisdictional partnership of public and private sector stakeholder interests. This partnership will consider and address short-and long-term issues surrounding anticipated increases in freight movement within the region and the likely impacts on the region's infrastructure and economic health.
Comments:	The funding for this initial study would come from a pooled fund, which would consist of a contribution of $60,000 from each participating state. The balance of the budget ($52,000) would be covered by the Midwest Regional University Transportation Center.

Study Number:	TPF5(086)
Status:	Cleared by FHWA
Title:	**Reducing Crashes at Rural Intersections: Toward a Multi-State Consensus on Rural Intersection Decision Support**
Lead Agency:	Minnesota Department of Transportation
Study Partners:	GA, IA, MN, NC, NH, WI
Contract Amount:	$367,000
100% SP&R Approval:	Approved
Objectives:	The Minnesota objective is to develop a better understanding of the causes of crashes at rural intersections and then develop a toolbox of effective strategies to mitigate the high crash rate. Preliminary information seems to point to the driver's inability to correctly identify and select the gap needed for safe passage. Efforts proposed in this program address rural intersection crashes through the application of a

suite of advanced surveillance technology, algorithms which predict vehicle and gap location, and driver interfaces designed to best provide necessary information to drivers at intersections. `Low tech' solutions will also be considered. The main program emphasis is on the integration of these key components into an effective, affordable system. We will focus on alternatives to traditional traffic signals as a means to decrease the frequency and severity of rural intersection crashes.

Comments: It is anticipated that each state will contribute $70,000 for this project. The funds can be transferred per the agencies discretion over three fiscal years. Committing states are asked to do so electronically.

Study Number: TPF5(080)
Status: Solicitation posted
Title: **Investigation of Low Temperature Cracking in Asphalt Pavement**
Lead Agency: Minnesota Department of Transportation
Partners: CT, ID, IL, KS, MN, ND, WI
Start Year: 2004
End Year: 2006
Duration: 18 months
100% SP&R Approval: Approved
Total Dollar Commitments Required: $750,000

Background: Low temperature cracking is the most prevalent distress found in asphalt pavements built in cold weather climates. As the temperature drops the restrained pavement tries to shrink. The tensile stresses build up to a critical point when a crack is formed and partial stress relief occurs. The current Superpave specification attempts to address this issue by specifying a limiting low temperature for the asphalt binder. The specification does a reasonable job predicting performance of conventional asphalt cements, but this does not hold true for polymer-modified asphalt binders that are manufactured to reach very cold temperature grades needed in cold climates. Typically the base asphalt binder controls the low temperature properties. As an example a PG 58-34 is made with an xx-34 grade asphalt and polymer is added to achieve the high end (58). Currently the low temperature specification considers only the asphalt binder. Specifications

must be developed for the complete asphalt mixture. Although low temperature cracking appears to be controlled by a single-event mechanism, it is very important to understand the mechanism of crack initiation and propagation. These cracks can be initiated by traffic loading, cycles of temperature changes, and then propagated by a large drop in temperature. In addition, the significant effect of aging and moisture on crack formation and propagation is also not fully understood and needs investigation.

Objectives: The development of a fracture-mechanics-based specification is one of the objectives of this study. It will allow for a better selection of asphalt binders and mixtures with respect to their resistance to crack formation and propagation. This fracture mechanics approach will also be used to investigate the detrimental role of aging and moisture to fracture resistance of asphalt materials.

Scope of Work: Utilize a national Technical Advisory Panel (TAP) to assist in the selection and development of testing methods that measure fundamental material properties related to low temperature cracking.

· Collect samples and mix designs from participating states and industry and run all recommended new testing methods.

· Correlate the test results with documented field performance.

· Develop and refine the most promising new testing methods for low temperature cracking.

· Calibrate and validate the thermal cracking model in the 2002 AASHTO design guide.

· Select mix designs for the reconstruction of MnROAD. Construction and field validation at MnROAD will be completed in the next phase of the study.

Comments: It is anticipated that each state will contribute $50,000 for this project. The funds can be transferred per the agencies discretion into three possible fiscal years 2004, 2005, and 2006. Committing states are asked to do so electronically.

APPENDIX C

MINNESOTA POOLED

FUND PROJECTS

MN POOLED FUND PROJECTS WITH BALANCES BUT NOT CONTRIBUTED TO IN THE 2004 PROGRAM
The table does not include NCHRP numbers.

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002001	Application of Global Positioning System for Planning	Unknown	0800	15,000.00	11,368.44	3,631.56
MINN	0002002	Geographic Information System-Transportation ISTEA Management Systems Server-Net Prototype	Unknown	0860	25,000.00	13,750.00	11,250.00
MINN	0002126	Integrated Drainage Design Computer System (later labeled HYDRAIN)	Active - Completion Date: March 2, 1994	0800	38,000.00	37,738.53	261.47
MINN	0002134	Test and Evaluation of Bridge Rails and Transitions	Active	0800	60,000.00	59,900.00	100.00
MINN	0002134	Test and Evaluation of Bridge Rails and Transitions	Active	0860	15,000.00	14,900.00	100.00
MINN	0002136	FHWA Traffic Noise Model (FHWA TNM) Software, Validation, and Training	Active	0860	5,000.00	4,900.00	100.00
MINN	0002144	Testing of Large and Small Support Signs	Testing has concluded.	0800	10,000.00	9,900.00	100.00
MINN	0002146	Testing of Roadside Safety Systems	Unknown	0860	42,000.00	25,935.99	16,064.01
MINN	0002146	Testing of Roadside Safety Systems	Unknown	Q560	50,000.00	2,923.51	47,076.49
MINN	0002155	Durability of Geosynthetics for Highway Application	Three final reports on task areas have been published. A 4th final report on another task area is being processed.	0860	30,000.00	23,072.26	6,927.74
MINN	0002157	Detection Technology for IVHS	Project is complete - final report has been posted	0800	20,000.00	9,212.94	10,787.06
MINN	0002159	Interpretation of Road Roughness Profile Data	Cleared by FHWA but pending approval on 100% SPR	0860	30,000.00	8,355.99	21,644.01

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002163	Calcium Magnesium Acetate (CMA) at Lower Production Costs	Final report completed, project closed	0860	25,000.00	23,997.41	1,002.59
MINN	0002165	Horizontally Curved Steel Bridge Research Study	As of 6/22/01 the final rpts. are still in draft form	0860	15,000.00	12,702.31	2,297.69
MINN	0002166	Performance Evaluation of Crumb Rubber Modifier (CRM) in Asphalt Pavements	Project deliverables have been completed and the project has been closed out	0860	20,000.00	15,605.88	4,394.12
MINN	0002167	Development of Anti-Icing Treatments	The final rpt has been completed, project closed out	0860	20,000.00	19,900.00	100.00
MINN	0002168	Management of the Discharge and Quality of Highway Runoff in Karst Areas to Control Impacts on Ground Water	The final report for this study has been received and is under review. Plans are being considered for public release of the report	0860	23,000.00	22,746.49	253.51
MINN	0002168	Management of the Discharge and Quality of Highway Runoff in Karst Areas to Control Impacts on Ground Water	The final report for this study has been received and is under review. Plans are being considered for public release of the report	Q560	5,000.00	639.50	4,360.50
MINN	0002170	High Strength Concrete for Bridges	Supposed to be completed in '01 – delayed because of an environmental lawsuit	0860	180,000.00	0.00	180,000.00
MINN	0002171	Predicting HOV Facility Demand	Pending Approval	0860	30,000.00	24,980.02	5,019.98
MINN	0002174	Accelerated Pavement Testing of Crumb Rubber Modified Asphalt Pavements	FHW would like funds for this program to be used for another project	0860	87,000.00	8,150.00	78,850.00
MINN	0002176	Validation of SHRP Asphalt and Asphalt Mixture Specifications Using Accelerated Loading	Study is complete. Awaiting the final report	0860	40,000.00	15,988.46	24,011.54
MINN	0002177	Fatigue Test of High Strength Prestressed Concrete Bridge Girders	MN was lead state on this-we show the project as closed	0860	60,000.00	0.00	60,000.00

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002178	Seasonal Changes in Pavement Material Properties	MN was lead state on this- we show the project as closed	0860	60,000.00	0.00	60,000.00
MINN	0002179	Load Testing of Instrumented Pavement Sections	Final report for this study is number 2000-35. Project is completed but needs to be closed out	0860	90,000.00	0.00	90,000.00
MINN	0002180	Pavement Performance Model Development	As of 6/12/01 final report is available	0860	10,000.00	0.00	10,000.00
MINN	0002182	Development and Validation of Traffic Data Editing Procedures (TDEP)	As of 2/5/02 study was finishing up. Final was to be issued within 2 months	0860	30,000.00	0.00	30,000.00
MINN	0002182	Development and Validation of Traffic Data Editing Procedures (TDEP)	As of 2/5/02 study was finishing up. Final was to be issued within 2 months	Q560	20,000.00	0.00	20,000.00
MINN	0002184	Long Term Monitoring of Mitigating Corrosion Measures	Active - Final report will be completed by 3/31/03.	0860	20,000.00	19,900.00	100.00
MINN	0002185	Development of Fiber-Optic Sensors to Monitor the Impact of Truck Weights on Pavements and Structures [Completion date September, 2002]	Final draft was in prep on 5/9/01	0860	5,000.00	2,701.43	2,298.57
MINN	0002186	Safety Evaluation of Intersection Design Improvements for Safety Management	The study has proven successful, and the draft final report is currently under review. (2/05/02)	0860	75,000.00	60,785.14	14,214.86
MINN	0002187	Roadside Safety Hardware Crash Tested to NCHRP Report 350	Active	0860	50,000.00	49,658.36	341.64
MINN	0002188	Crash-Tested Safety Appurtenances for Work Zones	Active	0860	50,000.00	16,529.55	33,470.45

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002189	Support, Maintenance, and Refinement of the National Transportation Control/ITS Communications Protocol (NTCIP) [Completed]	Unknown	0860	5,000.00	0.00	5,000.00
MINN	0002191	Public Service Campaign - Work Zones	COMPLETED. A new campaign, entitled Get The Picture. Listen To The Signs was developed	0860	5,000.00	0.00	5,000.00
MINN	0002192	Durability of Geosynthetics - Phase II	Active - As of 2/2002, the final report is being written. All of the field and lab work have been completed.	0860	20,000.00	5,489.41	14,510.59
MINN	0002193	Accuracy of Traffic Load Monitoring and Projections Related to Traffic Data Collection Parameters	Active as of April of 2000- several deliverables are available on the web	0860	15,000.00	11,588.24	3,411.76
MINN	0002194	Collection of Data to Relate Vehicle Operating Weights to Registered Weights for Highway Cost Allocation and User-Fee Analysis [Completion date 3/31/02]	Active	0860	10,000.00	66.79	9,933.21
MINN	0002195	Resistance Factors for Drilled Shafts with Minor Defects	Complete - Final report disseminated to participating states. Study went as planned and met objectives of FHWA. (2/4/02)	0860	15,000.00	12,667.82	2,332.18
MINN	0002196	Electrochemical Properties and Reactions at the Surfaces and Interfaces of Concrete Aggregates, Cement and Mineral Admixtures	Active -MN not listed as a participant on web – Fed – Aid form dated 2/11/99 to de-obligate in file. File notes indicate continued interest.	Q560	15,000.00	6,171.48	8,828.52

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002197	Bridge Fatigue Screening, Monitoring and Retrofitting Manual	Unknown	Q560	40,000.00	0.00	40,000.00
MINN	0002198	Engineered Flowable Fill Bridge Approaches plus Abutment and Culvert Backfill using Inexpensive Recycled Materials [Cancelled]	Project cancelled – 1998 This study has been merged with NCHRP 24-12 since both studies dealt with the same problem and all concurred.	Q560	20,000.00	12,288.00	7,712.00
MINN	0002199	Optimal Acceptance Procedures for Statistical Construction Specifications	Active -Currently reviewing the draft manual submitted by the contractor. Therefore, completion date of the study has been extended an additional six months through 8/28/02. (2/7/02)	Q560	25,263.00	8,990.19	16,272.81
MINN	0002200	Compilation and Evaluation of Results from High-Performance Concrete Bridge Projects	Active	Q560	4,000.00	14.67	3,985.33
MINN	0002202	HPMS Computer Based Training	The final product has been delivered by the contractor and the software is being disseminated to all of the state DOTs. (2/5/02)	Q560	20,000.00	19,293.26	706.74
MINN	0002209	Enhanced Guidance for Implementation of Safety Strategies	Active	Q560	150,000.00	0.00	150,000.00
MINN	0002210	Comprehensive Highway Safety Improvement Model	Active	Q560	50,000.00	324.76	49,675.24
MINN	0002211	Bulk Specific Gravity Round Robin Using the Corelok Vacuum Sealing Device	Active – final report being readied	Q560	10,000.00	5,076.56	4,923.44
MINN	0002218	Durability of Segmental Retaining Wall Blocks	Active	Q560	35,000.00	0.00	35,000.00

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0002800	SHRP Implementation Asphalt Test Equipment	Active	0860	335,000.00	264,659.39	70,340.61
MINN	0003010	Crescent Study (Part I Funds) (This study not monitored by R&D)	Unknown	0860	70,000.00	37,556.95	32,443.05
MINN	0003021	Ice Forces On the St. Regis River	Closed Out In 1993	0860	10,000.00	9,900.00	100.00
MINN	0003024	HELP, Inc	Unknown	0860	40,000.00	30,000.00	10,000.00
MINN	0003027	Ohio SHRP Test Road-Instrumentation	COMPLETED IN 1998.	0860	4,400.00	0.00	4,400.00
MINN	0003033	Premature Rigid Pavement Deterioration	Study completed	0860	15,000.00	13,415.04	1,584.96
MINN	0003037	Public Perceptions of the Midwest's Highway Pavements	As of 7/7/01 the final reports have been completed. Our files do not indicate receipt.	Q560	146,405.00	135,399.26	11,005.74
MINN	0003044	Base Funding for North central Superpave Center	See TPF-5(021)	0860	20,000.00	13,701.74	6,298.26
MINN	0003044	Base Funding for North central Superpave Center	See TPF-5(021)	Q560	85,000.00	27,662.01	57,337.99
MINN	0003045	Use of Reclaimed Asphalt Pavement Under Superpave Specifications	Draft Final Report is being prepared (6/22/01) Project is behind schedule	Q560	15,000.00	0.00	15,000.00
MINN	0003046	Fillet Welding Procedure Qualification Research	Unknown	Q560	20,000.00	13,020.63	6,979.37
MINN	0003055	R&D of the 3rd Phase of an Autonomous Shadow Vehicle Prototype	As of 2/5/02 final rpt is under review	Q560	50,000.00	17,896.47	32,103.53
MINN	0003060	Highway Maintenance Concept Vehicle, Phase 3	File notes indicate Mn withdrew from project in 2000	Q560	90,000.00	90,216.94	-216.94
MINN	0003062	ITS Deployment Research and Professional Capacity Building	File notes state project is cancelled	Q560	50,000.00	586.78	49,413.22
MINN	0003063	IVI Specialty Vehicles Program	Active – draft final in review process	Q560	400,000.00	189,509.34	210,490.66

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0003064	Developing a National Strategic Plan for Advanced Construction and Maintenance Systems	Complete per note from Tom West in CA	Q560	60,000.00	0.00	60,000.00
MINN	0003065	Geosynthetic Reinforcement of Base Course Layer of Flexible Pavements	Complete – as of 11/15/01	Q560	20,000.00	17,479.80	2,520.20
MINN	0003068	Field Evaluation of the CTCLS Traffic Signal Load Switches	Unknown -	Q560	135,497.00	0.00	135,497.00
MINN	0003069	Eastern State Transportation Coalition Train Study	Unknown	Q560	35,000.00	22,445.00	12,555.00
MINN	0003071	A New Approach to Assessing Road User Charges	Project complete-reports to be posted shortly	Q560	80,876.00	21,895.91	58,980.09
MINN	0003072	Strength and Deformation Analysis of MSE Walls at Working Loads	Active	Q560	20,000.00	12,282.68	7,717.32
MINN	0003074	Pavement Research and Technology	Active	Q560	60,000.00	21,293.58	38,706.42
MINN	0003079	REPORT	Active	Q560	232,500.00	125,000.00	107,500.00
MINN	0003081	HERMES II	Active?	Q560	125,000.00	90,735.87	34,264.13
MINN	0003083	FIXS-Fabrication error Indexed examples and Solutions	Active	Q560	17,500.00	0.00	17,500.00
MINN	0003092	Fiber Reinforced Polymer Composite Prestressing Strands	Active - Study has been established and will be initiated when adequate funding commitments have been received.	Q560	25,000.00	0.00	25,000.00
MINN	0003093	Environmental/Durability Evaluation of Externally Bonded Composites for Concrete Strengthening	Active - Study has been established and will be initiated when adequate funding commitments have been received.	Q560	25,000.00	0.00	25,000.00

STATE	PROJ. NO.	PROJECT NAME	PROJECT STATUS	PROG. CODE	UNDER AGREEMENT	EXPENDITURE	BALANCE*
MINN	0003094	Pavement Marking Life Cycle	Active - Study has been established and will be initiated when adequate funding commitments have been received.	Q560	40,000.00	0.00	40,000.00
MINN	0003097	Machinability of High-Performance Steel	Active	Q560	10,000.00	0.00	10,000.00
MINN	0003098	Pavement Reconstruction Scheduling Software	Active - Study is nearing completion. Software has been distributed to participating states and 8 training sessions have been conducted. (updated: 10/16/03)	Q560	49,200.00	0.00	49,200.00
MINN	0003100	The Impact of the ISO 9000 Quality Assurance Standard on Safety Performance in the Trucking Industry	Final report approved and published – will be on the web site shortly	Q560	20,000.00	0.00	20,000.00
MINN	TPF5005	Study of Erection Issues and Composite System Behavior of the Full-Scale Curved Girder Bridge Currently under Test at the Turner-Fairbank Highway Research Center	Active	Q560	60,000.00	0.00	60,000.00
MINN	TPF5023	Investigation of Aggregate Shape Effects on Hot Mix Performance Using An Image Analysis Approach	Active	Q560	20,000.00	1,666.91	18,333.09
MINN	TPF-5(055)	Rapid Bridge Replacement Techniques	Active	Q560	10,000.00	0.00	10,000.00

TOTAL BALANCE 2,336,103.31

* Balances are good as of the date the FMIS report -12/19/03